

PROPOSED AMENDMENTS FOR EXAMINER'S AMENDMENT

LAW OFFICES

AMIN & TUROCY, LLP24TH FLOOR, NATIONAL CITY CENTER

1900 EAST NINTH STREET

CLEVELAND, OHIO 44114

TELEPHONE: 216-696-8730

FACSIMILE: 216-696-8731

EMAIL: BSTEED@THEPATENTATTORNEYS.COM

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TO: Quing Yuan Wu – U.S. Patent and Trademark Office
FAX NO.: 571-273-3776
FROM: Brian Steed

In re patent application of:

Applicant(s): John J. Richardson

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Art Unit: 2194

Title: MULTI-THREADED SYNCHRONIZATION ADAPTER

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Dear Examiner Wu:

Pursuant to our recent follow-up conversation, please find attached an updated set of proposed amendments. In deference to your request, we propose amending the title of the application as shown. In addition, minor corrections have been made to the previously proposed set of amendments in accordance with your comments during our discussion.

Should you find these updated proposed amendments acceptable, you are hereby authorized to perform an Examiner's amendment in accordance with the proposal.

If you have any additional concerns regarding this application in general or the proposed amendments in particular, please feel free to contact me at 614-561-4412.

Thank you again for your time and efforts in connection with this application.

Best regards,



-Brian Steed

Amin, Turocy, and Calvin, LLP

PROPOSED AMENDMENTS FOR EXAMINER'S AMENDMENT

PROPOSED AMENDMENT TO THE TITLE

MULTI-THREADED SYNCHRONIZATION ADAPTOR DRIVER FRAMEWORK
COMPONENT FOR SYNCHRONIZING INTERACTIONS BETWEEN A MULTI-
THREADED ENVIRONMENT AND A DRIVER OPERATING IN A LESS-THREADED
SOFTWARE ENVIRONMENT

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PROPOSED AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A computer-readable storage medium having stored thereon a driver management system executable by a processor, comprising:
a driver framework component (DFC) that is separate from a driver, the DFC comprising:
a presentation component that selectively exposes adapter objects to the driver in a multi-threaded environment, the adapter objects synchronize interactions between the driver and the multi-threaded environment according to a hierarchical locking model selected by the driver at configuration time, the hierarchical locking model determines a primary synchronization object level at which locks are applied during synchronization, the available synchronization object levels include at least one of a driver level, a device level, or a queue level.
2. (Original) The system of claim 1, further comprising an operating system kernel that operates or performs in a multi-threaded software environment.
3. (Original) The system of claim 2, the driver of claim 1 operates in a less-threaded software environment than the operating system kernel.
4. (Previously Presented) The system of claim 1, at least one of the adapter objects includes internal state data and one or more sets of locks for managing interactions between the driver and the DFC.
5. (Previously Presented) The system of claim 4, the at least one adapter object includes an internal object state lock that provides synchronization for modifications to the internal state data.
6. (Previously Presented) The system of claim 5, the internal object state lock is acquired and released for short time intervals in response to an event from a system that modifies the at least one adapter object, or an API call from a software module or driver.

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7. (Previously Presented) The system of claim 4, the at least one adapter object includes a presentation lock that is acquired when events are presented through event handler callbacks into a less threaded software module.
8. (Original) The system of claim 7, when the event handler callback returns, the presentation lock is automatically released.
9. (Previously Presented) The system of claim 1, at least one adapter object employs a series of reference counts, request deferrals, or other programming components to facilitate object lifetime and event exposure to a less threaded software module.
10. (Original) The system of claim 1, the adapter objects are employed for request dispatch, locking, or synchronization.
11. (Original) The system of claim 1, the DFC automatically manages synchronization and race conditions that occur in a driver environment.
12. (Original) The system of claim 11, the DFC provides a flexible configuration model in which a driver designer can select an amount of synchronization desired depending on device requirements or performance goals.
13. (Original) The system of claim 1, the driver registers a set of callback functions to the adapter objects during initialization of the driver.
14. (Original) The system of claim 1, the DFC raises events that occur such as Delayed Procedure Calls (DPC's), I/O cancellation events, plug and play events, or power management events.
15. (Previously Presented) The system of claim 1, at least one adapter object is associated with at least one of a request object, a driver object, a device object, and a queue object.

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16. (Original) The system of claim 15, at least one of the objects is owned or derived from at least one other object.
17. (Previously Presented) The system of claim 1, at least one adapter object including at least one of a spinlock, a shared lock, and a FAST_MUTEX.
18. (Previously Presented) The system of claim 5, the DFC automatically optimizes the sharing of internal object state locks between its internal I/O paths.
19. (Previously Presented) The system of claim 1, at least one adapter object allows the driver to specify an optional context memory allocation to be associated with the adapter object, the driver stores its primary data structure in the context memory to facilitate interaction with the data structure according to the DFC's hierarchical locking model.
20. (Cancelled)
21. (Previously Presented) The system of claim 1, the hierarchical locking model includes a non-synchronization model that places the entire burden of synchronization on the driver.
22. (Original) The system of claim 1, further comprising at least one of a synchronous and an asynchronous threading model.
23. (Original) The system of claim 1, further comprising at least one of a lock for inter-object communications, a lock verifier, a lock organizer, and an automatic child-locking component.
- 24-34. (Cancelled)